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[TITLE OF INVENTION]

A Character Entry Device and A Method For Entering Characters

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[CLAIMS]

[Claim 1] A character entry device comprising:

a display means for displaying input/output results;

20 an entry means for instructing coordinates corresponding to the  
displaying content of said display means; and

a control means for controlling said display means and said entry  
means, wherein

the display screen of said display means includes:

25 a character-selection area for selecting an entry character out of a  
predetermined group of plural characters; and

a display area for displaying as needed a selected character selected  
in said character-selection area at least until the selected character selected  
in said character-selection area is fixed as a fixed character, and displaying  
30 sequentially the fixed character by means of designating the entry of said  
selected character as a fixed character.

[Claim 2] A character entry device set forth in claim 1, wherein  
said display area includes:

5 a selected character designation/display area for displaying as  
needed a selected character selected in the character-selection area at least  
until the selected character selected in said character-selection area is fixed  
as a fixed character, and designating said selected character as an  
entry-fixed character; and

a fixed character display area for displaying sequentially said  
entry-fixed character.

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[Claim 3] A character entry device set forth in claim 2, wherein  
said selected character designation/display area comprises:

15 a selected character display area for displaying as needed a selected  
character selected in the character-selection area at least until the selected  
character selected in said character-selection area is fixed as a fixed  
character; and

a designation display area for designating a selected character  
displayed in said selected character display area as an entry-fixed character.

20 [Claim 4] A character entry device comprising:

a display means for displaying input/output results;

a transparent touch panel entry means, which is disposed on the  
display screen of said display means, for instructing coordinates  
corresponding to the displaying content of said display means; and

25 a control means for controlling said display means and said entry  
means, wherein

said display means includes:

30 a fixed character display area for selecting an entry character key,  
which is provided on almost the whole of the upper half of the display  
screen of said display area; and

a character-selection area for selecting an entry character out of a  
predetermined group of plural characters, and a selected character

designation/display area for displaying as needed a selected character selected in the character-selection area at least until the selected character selected in said character-selection area is fixed as a fixed character and designating said selected character as an entry-fixed character, both of which are provided on almost the lower half of the display screen.

[Claim 5] A character entry device set forth in claim 4, wherein said character-selection area is provided near the corner on the operator's arm-side in almost the lower half of the display screen, said selected character designation/display area is provided at the center of almost the lower half of the display screen, and an execution key for executing the contents of said fixed character display area and a clear key for clearing said contents are provided on the opposite side to the operator's arm-side in almost the lower half of the display screen.

[Claim 6] A character entry device set forth in claim 5, wherein said display means further includes an image-switching means for switching from the image when said operator's arm is a right arm to the image when it is a left arm.

[Claim 7] A character entry device set forth in any of claims 1 to 6, wherein said character-selection area includes a plurality of partitions corresponding to the individual characters displayed therein, each of the plurality of partitions being not required to have a mark for indicating to which character said partition corresponds.

[Claim 8] In a character entry device comprising: a display means for displaying input/output results; an entry means for instructing coordinates corresponding to the displaying content of said display means; and a control means for controlling said display means and said entry means,

a method for entering characters comprising the following steps:

- (i) selecting an entry character out of a predetermined group of plural characters in a character-selection area displayed on the display means;
- (ii) temporarily displaying the entry character selected in the character-selection area as a selected character;
- (iii) instructing said selected character as being fixed; and
- (iv) displaying thus-instructed selected character as a fixed character at a predetermined position.

[Claim 9] A method for entering characters set forth in claim 8, wherein

a selected character selected in the character-selection area is temporarily displayed, that is maintained at least until said selected character is fixed as a fixed characters;

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[Claim 10] In a character entry device comprising: a display means for displaying input/output results; an entry means for instructing coordinates corresponding to the displaying content of said display means; and a control means for controlling said display means and said entry means,

20 a method for entering characters comprising the following steps:

- (i) selecting an entry character out of a predetermined group of plural characters in a character-selection area displayed on the display means;
- (ii) temporarily displaying a selected character selected in the character-selection area;

25 (iii) when the temporarily-displayed selected character is not indicated as being fixed and a character is selected again in the character-selection area, clearing the previously-selected character and temporarily displaying the currently-selected character;

(iv) fix-instructing said selected character temporarily-displayed; and

30 (v) displaying fix-instructed selected character as a fixed character at a predetermined position.

[Claim 11] A method for entering characters set forth in any of claims 8 to 10, wherein

said selected character is temporarily displayed at a predetermined fixed position other than said character-selection area and said fixed character is displayed sequentially in series in a fixed area other than the character-selection area.

[Claim 12] A character entry device comprises:

- a display means for displaying input/output results;
- 10 an entry means for instructing coordinates corresponding to the displaying content of said display means;
- a storing means including a selected character file in which entry characters are defined corresponding to coordinate data; and
- a control means for governing said display means, said entry means and said storing means, wherein
- 15 the display screen of said display means includes:
  - a character-selection area in which a plurality of partitions formed corresponding to entry characters are arranged according to the standard character arrangement;
  - 20 a selected character designation/display area for displaying as needed a selected character selected in said character-selection area at least until the selected character selected in said character-selection area is fixed as a fixed character and designating said selected character as an entry fixed character; and
  - 25 a fixed character display area for displaying sequentially said entry fixed character.

[Claim 13] In a character entry device comprises: a display means for displaying input/output results; an entry means for instructing coordinates corresponding to the displaying content of said display means; a storing means including a selected character file in which entry characters are defined corresponding to coordinate data; and a control means for

governing said display means, said entry means and said storing means,  
a method for entering characters comprising the following steps:

- (i) selecting a partition in a character-selection area displayed on the display means, wherein a plurality of partitions set corresponding to entry characters are arranged according to the standard character order;
- (ii) obtaining coordinate data of said selected partition through the entry means, reading a selected character corresponding to said coordinate data from the selected character file, and then temporarily displaying as needed said selected character at a predetermined position outside the character-selection area at least until [said selected character] is fixed as a fixed character;
- (iii) instructing said selected character temporarily displayed as being fixed; and
- (iv) displaying thus-instructed selected character as a fixed character at a predetermined position.

[Claim 14] In a character entry device comprises: a display means for displaying input/output results; an entry means for instructing coordinates corresponding to the displaying content of said display means; a storing means including a selected character file in which entry characters are defined corresponding to coordinate data; and a control means for governing said display means, said entry means and said storing means,  
a method for entering characters comprising the following steps:

- (i) selecting a partition in a character-selection area displayed on the display means, wherein a plurality of partitions set corresponding to entry characters are arranged according to the standard character order;
- (ii) obtaining coordinate data of said selected partition through the touch panel, reading a selected character corresponding to said coordinate data from the selected character file, and then temporarily displaying as needed said selected character in a selected character-designation display area which is displayed in an operation key fashion outside the character-selection area at least until [said selected character] is fixed as a

fixed character;

(iii) instructing said selected character, which is temporarily displayed in the selected character-designation display area, as being fixed; and

(iv) displaying thus-instructed selected character as a fixed character at  
5 a predetermined position in a fixed character display area.

[Claim 15] According to another point of view, a method for entering characters according to the present invention is a method for entering characters in a character entry device comprising: a display means for  
10 displaying input/output results; a touch panel [entry means], which is disposed on the display screen of said display means, for instructing coordinates corresponding to the displaying content of said display means; a memory means including a selected character file in which entry characters are defined corresponding to coordinate data; and a control  
15 means for governing said display means, entry means and memory means, said method comprises the following steps:

(i) skimming over, and touching for instruction, a character-selection area displayed on the display means, wherein a plurality of partitions set corresponding to entry characters are arranged according to the standard  
20 character order, so as to select a partition;

(ii) obtaining coordinate data of said selected partition through the touch panel, reading a selected character corresponding to said coordinate data from the selected character file, and then temporarily displaying as needed said selected character in a selected character-designation display  
25 area which is enlarged and displayed in an operation key fashion outside the character-selection area at least until [said selected character] is fixed as a fixed character;

(iii) instructing said selected character, which is temporarily displayed in the selected character-designation display area, as being fixed; and  
30 (iv) displaying thus-instructed selected character as a fixed character at a predetermined position in a fixed character display area.

## [DETAILED DESCRIPTION OF INVENTION]

[0001]

[Field of Industrial Application]      The present invention relates to a  
5 device for an operator to enter characters and the like with viewing a  
display in an information processing unit, particularly to a device for  
entering characters and the like which allows a weak-eyed person to enter  
them with reduced errors in entry. More specifically, the present  
invention preferably includes a transparent touch screen entry means  
10 disposed on the screen of a display means, wherein various sorts of  
operational guidance and operation keys are displayed on the display  
screen and the touching of a finger [of the operator] or an entry pen to each  
of the displayed keys starts entering operation.

15 [0002]

[Prior Art]      In the past, known was an information entry device  
equipped with a transparent coordinate-entry tablet (a touch screen entry  
means) disposed on the screen of a display such as a CRT display, a liquid  
crystal display, etc., wherein a software keyboard was displayed on the  
20 display screen and the coordinate-entry plane over the displayed keys was  
manipulated to enter information.

[0003]      This information entry device had such a problem to be  
solved that, because the entry plane was manipulated directly by a finger or  
25 else, the denotation of function at the center and such of each key was  
hidden in the case of manipulating specified operation keys displayed on  
the display screen. Patent *Kokai* 1-269119 publication discloses that  
when an entry plane is manipulated, the entry function corresponding to a  
manipulating position in the said entry plane is displayed at a  
30 predetermined position, other than the said manipulating position in the  
entry plane, on the display screen and the completion of manipulating the  
entry plane starts the corresponding information entry.

[0004]

[Problem To Be Solved By Invention] In the prior art described above, the denotation of a function to be entered, which corresponds to a certain manipulation, is displayed in an area apart from the manipulating position in the entry plane, and therefore it is possible for an operator to easily select the function corresponding to the current manipulation. However, a selected entry function key out of the keys displayed on the screen is pressed down and then the selected function to be entered is performed at the time of cancelling the pressing-down. Therefore, there is a risk of an erroneous entry operation that the function to be entered may be performed at the time when the operator takes its finger etc. off from the display screen.

[0005] In particular, this type of a touch screen entry device is widely applied to information processing equipments designed for a user unfamiliar with the operation of them, for example, an automatic transaction-processing machine for a broad range of users such as an automatic teller machine. From this it follows that the prior art described above, which is designed to start the entry function at the time of taking a finger etc. off from the display screen, faces a significant problem of errors in entry.

[0006] Further, in the prior art described above, for cancellation of the selected function by pressing-down, a finger must be shifted outside of the area of the pressed key and then taken off from the display screen, that is confusing and troublesome to a user unfamiliar with its operation.

[0007] Still further, this type of a touch screen entry device displays a lot of information such as various kinds of operation keys, operational guidance, etc. on one display screen and therefore inevitably requires a reduced size of each key. Especially, in an entry screen for Japanese

characters or the alphabet requiring many relevant keys, a keyboard with a number of entry keys is displayed and therefore the selectively-pressing of a target entry key out of the number of entry keys puts a great burden on an aged person or a weak-eyed person.

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[0008] The present invention was developed and an object thereof is to provide a character entry device and a method for entering characters which are capable of reducing errors in entry of characters.

10 [0009] Another object of the present invention is to provide a character entry device and a method for entering characters which are friendly to weak-eyed users.

[0010]

15 [Means For Solving Problem & Operation] A typical configuration of the present invention will be illustrated below.

[0011] A character entry device according to the present invention comprises:

20 a display means for displaying input/output results;  
an entry means for instructing coordinates corresponding to the displaying content of the said display means; and  
a control means for controlling the said display means and the said entry means, wherein  
25 the display screen of the said display means includes:  
a character-selection area for selecting an entry character out of a predetermined group of plural characters; and  
a display area for displaying as needed a selected character selected in said character-selection area at least until the selected character selected  
30 in said character-selection area is fixed as a fixed character, and displaying sequentially the fixed character by means of designating the entry of said selected character as a fixed character

[0012] Preferably, the said display area includes:

a selected character designation/display area for displaying as  
needed a selected character selected in the character-selection area at least  
5 until the selected character selected in said character-selection area is fixed  
as a fixed character, and designating said selected character as an  
entry-fixed character; and

a fixed character display area for displaying sequentially said  
entry-fixed character.

10 The said selected character designation/display area comprises:

a selected character display area for displaying as needed a selected  
character which is selected in the character-selection area at least until the  
selected character selected in the said character-selection area is fixed as a  
fixed character; and

15 a designation display area for designating a selected character  
displayed in the said selected character display area as an entry-fixed  
character.

[0013] According to another point of view, a character entry device  
20 according to the present invention comprises:

a display means for displaying input/output results;

a transparent touch panel entry means, which is disposed on the  
display screen of the said display means, for instructing coordinates  
corresponding to the displaying content of the said display means; and

25 a control means for controlling the said display means and entry  
means, wherein

the said display means includes:

on almost the whole of the upper half of the display screen of the  
said display area, a fixed character display area for selecting an entry  
30 character key; and

on almost the lower half of the display screen, both of a  
character-selection area for selecting an entry character out of a

predetermined group of plural characters and a selected character designation/display area for displaying as needed a selected character which is selected in the character-selection area at least until the selected character selected in the said character-selection area is fixed as a fixed  
5 characters and designating the said selected character as an entry-fixed character.

[0014] In this case, it is desirable that the said character-selection area is provided near the corner on the operator's arm-side in almost the  
10 lower half of the display screen, the said selected character designation/display area is provided at the center of almost the lower half of the display screen, and an execution key for executing the contents of the said fixed character display area and a clear key for clearing the said contents are provided on the opposite side to the operator's arm-side in  
15 almost the lower half of the display screen. There may be provided an image-switching means for switching from the image in the case where the said operator's arm is a right arm to the image in the case of a left arm.

[0015] It is preferable that a plurality of partitions corresponding to  
20 the individual characters in the said character-selection area and each of the plurality of partitions is not required to have a mark for indicating to which character the said partition corresponds.

[0016] A method for entering characters according to the present  
25 invention is a method for entering characters in a character entry device comprising: a display means for displaying input/output results; an entry means for instructing coordinates corresponding to the displaying content of the said display means; and a control means for controlling the said display means and the said entry means,

30 the said method comprises the following steps:

[0017]

- (i) selecting an entry character out of a predetermined group of plural characters in a character-selection area displayed on the display means;
- (ii) temporarily displaying the entry character selected in the character-selection area as a selected character;
- 5 (iii) instructing the said selected character as being fixed; and
- (iv) displaying thus-instructed selected character as a fixed character at a predetermined position.

[0018] When the temporarily-displayed selected character is not  
 10 indicated as being fixed and a character is selected again in the character-selection area, the previously-selected character is cleared and the currently-selected character is temporarily displayed.

[0019] Preferably, the said selected character is temporarily  
 15 displayed at a predetermined fixed position other than the said character-selection area and the said fixed character is displayed sequentially in series in a fixed area other than the character-selection area.

[0020] According to another point of view, a method for entering  
 20 characters according to the present invention is a method for entering characters in a character entry device comprising: a display means for displaying input/output results; a touch panel [entry means], which is disposed on the display screen of the said display means, for instructing coordinates corresponding to the displaying content of the said display  
 25 means; a memory means including a selected character file in which entry characters are defined corresponding to coordinate data; and a control means for controlling the said display means, entry means and memory means,

the said method comprises the following steps:

30

[0021]

- (i) skimming over, and touching for instruction, a character-selection

area displayed on the display means, wherein a plurality of partitions set corresponding to entry characters are arranged according to the standard character order, so as to select a partition;

- (ii) obtaining coordinate data of the said selected partition through the touch panel, reading a selected character corresponding to the said coordinate data from the selected character file, and then temporarily displaying as needed the said selected character in a selected character-designation display area which is enlarged and displayed in an operation key fashion outside the character-selection area at least until [the said selected character] is fixed as a fixed character;
- (iii) instructing the said selected character, which is temporarily displayed in the selected character-designation display area, as being fixed; and
- (iv) displaying thus-instructed selected character as a fixed character at a predetermined position in a fixed character display area.

[0022]

[Operation] According to the present invention, a selected character freely selected in the character-selection area is once and temporarily displayed (tentative display) outside the character-selection area at least until it is fixed as a fixed character. It is possible for a user to check this temporary display and then return to select an entry character again or carry on the entry operation. Specifically, checking the propriety of the selected character temporarily displayed in the said selected character-designation display area, when the selection is wrong, an entry character is selected again in the character-selection area. On the other hand, when the selection is correct, an entry-fixed character is fixed in the selected character-designation display area (or a designation area provided separately apart from other areas in order to designate an entry-fixed character) and then the fixed character is displayed sequentially in series in the fixed character display area.

[0023] As described above, the conclusion and designation of an entry character is a distinct operation from the selection of an entry character, whereby the risk of errors in entry is reduced. In addition, because a selected character is displayed outside the character-selection area, it is not always necessary to visually check the character-selection  
5 area and also it is unnecessary to add a mark of letters to each partition. Thus, a user has only to skim over the character-selection area by its finger within a narrowed range, so that the designating operation becomes easier.

10 [0024] On the other hand, the designation area to be visually checked is only necessary to display one character and therefore can be established as a large area at a fixed position on the display screen. Thus, it is possible to provide a character entry device which is easily viewable and friendly to either aged users or weak-eyed users and further has a high  
15 operability.

[0025] Further, an area, in which a freely selected character in the character-selection area is temporarily displayed, is provided separately apart from the fixed character display area for displaying an entry-fixed  
20 character sequentially in series. Every time a selected character is fixed to be fixed, the fixed character is sequentially transferred to the fixed character display area and displayed therein in series. Thus, a user can know easily and precisely that the said character has been fixed.

25 [0026] Still further, together with the provision of a touch panel entry means, a fixed character display area is provided on almost the whole of the upper half of the display screen and both of a character-selection area and a selected character designation/display area are provided on almost the lower half of the display screen. Or the said character-selection area is  
30 provided near the corner on the operator's arm-side, the said selected character designation/display area is provided at the center thereof, and an execution key and a clear key are provided on the opposite side to the

operator's arm-side. For this reason, it does not happen that the character-designating area and the display area both to be visually checked are hidden by the operator's arm. Such a screen image configuration allows a user to execute a character entry operation by its arm with the optimum operability.

[0027] A method for entering characters and a character entry device according to the present invention are suitable especially for its applications aimed at users of unspecified majority such as automatic teller machines etc..

[0028]

[Examples] Hereinafter, examples of the present invention will be explained in detail with referring to the drawings.

[0029] Figures 1 to 6 illustrate an example of a touch panel entry device according to the present invention, wherein Figures 1 to 3 are illustrative views of the entry display screen, Figure 4 is a diagram showing the device's configuration, Figure 5 is diagrams showing the contents of the entry character file, and Figure 6 is a flow chart for explaining the device's operation. Note that the same signs designate the same parts in all the figures.

[0030] Firstly, referring to Figure 4, the configuration of a touch panel entry device of the present example will be explained. In the figure, sign 1 indicates a display made of a CRT display, a liquid crystal display, etc., a liquid crystal display being employed in the present example. Sign 2 indicates a transparent touch panel disposed on the display screen of display 1. Although the present example employs an electrostatic touch panel, another type of a touch panel such as pressure-sensitive type, photosensitive type, electrode-structured type, sonic wave-vibration type, etc. may be employed. Display 1 and touch panel entry device 2 frame an

entry/display section 3.

[0031] Sign 4 indicates a display control section, which controls the display screen of display 1. Sign 5 indicates a coordinate-detector section, which generates coordinate data based on X-axis data and Y-axis data [of a point] pressed by a finger or an entry pen on touch panel 2. Sign 6 indicates a memory, which stores data of various types of images to be depicted on display 1. Sign 7 indicates a control section for controlling the touch panel entry device, which make various types of image based on data from memory 6 be depicted on display 1 through display control section 4 and receives coordinate data corresponding to an image depicted on display 1 through touch panel 1 [t: 2] and coordinate-detector section 5 so as to carry out an entry operation. Control section 7 includes central processing unit (CPU) and input/output unit which are not shown. Memory 6 stores various sorts of programs executed by CPU and various sorts of data relevant to its execution. A selected character file described below is also included in these various sorts of data. Memory 6 may include external storage devices such as a hard disk etc..

[0032] Next, referring to Figure 1, an explanation will be made on the display screen of a touch panel entry device in the present example. Display screen 8 of display 1 includes character-selection area 9 on the right side of the lower portion of the screen, selected character-designating area 10 (called as an entry character key) at the center of the lower portion of the screen, execution key 11 and clear key 12 on the left side of the lower portion of the screen, and fixed character display area 13 in the upper portion of the screen.

[0033] Character-selection area 9 is provided for selection of entry character key 10, wherein a group of characters are displayed like the grid of a go board partitioned vertically and horizontally and an entry character can be selected by pressing the corresponding partition 14. Entry

character key 10 shows an entry character selected in character-selection area 9 in a key fashion and the pressing of this entry character key 10 can convert the entry character into a fixed character. Fixed character display area 13 is provided for sequentially displaying the fixed character fixed by entry character key 10 in series. Execution key 11 is an operation key for instructing further operation on reference to a series of fixed characters displayed in fixed character display area 13. Clear key 12 is an operation key for clearing the series of fixed characters displayed in fixed character display area 13. Here, entry character key 10, execution key 11 and clear key 12 are depicted with the asperities so graphically expressed by shading and coloring as to impress on a user that they are keys to be pressed.

[0034] Display screen 8 in the present example adopts such a layout as is suitable for operation by a right hand. Specifically, in the case of manipulating character-selection area 9 by a right hand, entry character key 10 necessary for visual check and having high relevance is displayed largely and distinctly at the center of the screen on the left side of character-selection area 9. Further, fixed character display area 13 showing a series of fixed characters is displayed in a widespread fashion in the upper portion of the screen. Therefore, it never happens that the manipulating right hand prevents entry character key 10 and characters displayed in fixed character display area 13 from being visually checked. In addition, execution key 11 manipulated at a low frequency and clear key 12 to be prevented from erroneous manipulation are located in the lower left portion of the screen which is inconvenient for right hand's manipulation.

[0035] In this connection, the locations of execution key 11 and clear key 12 may be changeable. The displaying layout of display screen 8 may be also mirror-reversed into one suitable for left hand's manipulation. Further, it may be also possible to prepare a screen image for left hand's manipulation as well as one for right hand's manipulation and provide a

screen-reversible key in display screen 8 or another setting screen so as to allow a user to select any of the screen images.

[0036] Referring to Figure 5, an explanation will be made on the contents of a file for selecting a character to be displayed in entry character key 10 from character-selection area 9. In the figure, Figure 5(a) is an enlarged diagram of character-selection area 9, Figure 5(b) is a diagram showing the contents of a selected character file stored in memory 6, and Figure 5(c) is a concordance table between character-selection area 9 and selected character keys in the selected character file. In the present example, firstly, in order to select an entry character out of 50-sound *katakana* syllabary, character-selection area 9 is partitioned into 11 rows “a, ka, sa, ta, na, ---” in X-axis direction and 5 columns “a, i, u, e, o” in Y-axis direction. Each partition 14 has no identifying denotation of the corresponding character, but it is colored alternately in white or black to such a extent as to be distinguishable from surrounding partitions. Touch panel 2 disposed on character-selection area 9 is capable of specifying the addresses in X-axis and Y-axis directions with respect to each partition 14. Note that, although coordinate numbers and XY are depicted in the periphery of character-selection area 9 colored alternately in white or black as shown in Figure 5(a), they are added for explanation and may be removable in an actual screen without spoiling the meritorious effects of the invention. Further, though being not shown, it may be possible to add characters having a voiced sound mark, characters representing a contracted sound, etc. in character-selection area 9. Still further, it may be also possible to further provide a character-type selection key for switching between “kana” and “alphabet” and another character-selection area 9 for “alphabet” and perform an entry operation using a desired character type by switching the character-type selection key.

[0037] On the other hand, as shown in Figure 5(b), memory 6 stores selected character file 50 which stores address data consisting of

X-axis data and Y-axis data specified in character-selection area 9 and the corresponding characters to the data. For example, address data of  $X_1$  and  $Y_1$  is related to a character “a” and address data of  $X_1$  and  $Y_4$  is related to a character “e”. This relationship between address data and characters is  
 5 defined such that character-selection area 9 forms 50-sound *katakana* syllabary as shown in Figure 5(c).

[0038] In the present example, on the operator’s instruction as to a partition 14 in character-selection area 9, the corresponding character to the  
 10 partition 14 is largely displayed in selected character-designating area 10 provided separately apart from character-selection area 9. Therefore, even though character-selection area 9 have no denotation of the corresponding characters, the operator can easily know the currently-designated character. Further, because the character arrangement in character-selection area 9 is  
 15 formed in a 50-sound *kana* syllabary fashion, the instructing operation of a target character is accelerated. In addition, if manipulating in a manner of skimming over character-selection area 9, it is possible to advance an entry operation with viewing selected characters displayed on entry character key  
 10. Therefore, the size of character-selection area 9 can be reduced, i.e.,  
 20 many entry keys of a condensed size can be arranged. This allows a good margin of space for display screen 8 and, as a result, entry character key 10 can be largely displayed.

[0039] Next, according to the operation flow shown in Figure 6, the  
 25 operation of a touch panel entry device of the present example will be explained below.

[0040] Firstly, in order to display the initial screen shown in Figure 1, control section 7 reads image data of the screen shown in Figure 1 from  
 30 memory 6 and then, through display control section 4, makes the image data be displayed as the screen image on display 1. In this state, it is possible to picked up a selected character in character-selection area 9 (Step

61).

[0041] In order to pick up a selected character, character-selection area 9 is pressed by a fingertip or an entry pen and then coordinate-detector section 5 generates coordinate data based on X-axis data and Y-axis data obtained from touch panel 2 and sends the coordinate data to control section 7. After receiving the said coordinate data, control section 7 extracts the corresponding character to the address data from selected character file 50 stored in memory 6 and makes it be displayed on entry character key 10 through display control 4 (Step 62). In the present touch panel entry device, a selected character is searched in character-selection area 9 and checked on entry character key 10. Therefore, normally, a target selected character is picked up by skimming over character-selection area 9 to search the target character with viewing character images displayed [one after the other] on entry character key 10. For example, when the character “hi” is to be selected in Figure 5, the target selected character can be picked up by skimming along an arrow Q. Specifically, at first, a finger touches the display screen at a position  $X_1, Y_1$  so as to display “a” on entry character key 10. Next, the finger skims over character-selection area 9 along X-axis direction so as to display characters one after the other, i.e., “a”, “ka”, “sa”, “ta”, “na”, “ha” in this order, on entry character key 10. At a position  $X_6, Y_1$  of “ha”, the finger skims along Y-axis direction and then picks up the target character of “hi”.

[0042] Figure 1 shows the display screen in the course of picking up a selected character. Therein, shown is the state wherein fixed characters “na” and “ma”, which have been already fixed, are displayed in fixed character display area 13 and, at present, the character “e” is being picked up by the finger’s instruction in character-selection area 9.

30

[0043] Then, in order to fix a selected character displayed on entry character key 10 as a fixed character, entry character key 10 is pressed

(Step 63: YES). Thereby, coordinate-detector section 5 generates coordinate data based on X-axis data and Y-axis data obtained from touch panel 2 and sends the coordinate data to control section 7. After receiving the said coordinate data, control section 7 acknowledges that the selected  
 5 character displayed on entry character key 10 has been fixed and then temporarily highlights the whole of entry character key 10 so as to inform the user the pressing of the key. After that, the selected character is displayed as a fixed character at a predetermined position in fixed character display area 13 and simultaneously the selected character displayed on  
 10 entry character key 10 is deleted (Step 64). Here, although the selected character on entry character key 10 is deleted simultaneously with the fixing of it in the present example, it may be deleted when a new character is succeedingly selected in character-selection area 9. In this case, the former selected character is further being displayed until the next selection  
 15 of a new character and therefore, when the same character happens to succeed thereto, only a fixing operation is required without selecting again the same entry character.

[0044] On the other hand, when wanting to change the selected  
 20 character displayed on entry character key 10, it is possible to search again a target selected character in character-selection area 9 (Step 65). In the present touch panel entry device, a selected character displayed on entry character key 10 is not fixed as a fixed character unless entry character key 10 is pressed. Therefore, even though the finger is taken off from  
 25 character-selection area 9, it is possible to select/change a selected character as many times as needed.

[0045] Figure 2 illustrates the state wherein the selected character  
 30 "e" displayed on entry character key 10 is converted into a fixed character by pressing it. Figure 3 illustrates the state wherein the selected character "e" is displayed as a fixed character at a predetermined position in fixed character display area 13, i.e., next to "na ma", and that the selected

character displayed on entry character key 10 is deleted.

[0046]           Next, in order to execute the entry processing of a series of fixed characters displayed in fixed character display area 13, e.g., “*na ma*  
5 *e*” shown in Figure 3, the pressing of execution key 11 allows control section 7 to execute the entry processing and the series of fixed characters to be removed from fixed character display area 13 (Step 66: YES).

[0047]           On the other hand, in order to pick up a further selected  
10 character, it may be possible to search a target selected character in character-selection area 9 again (Step 66: NO).

[0048]           Further, it may be also possible to clear fixed character display area 13 and start a new entry processing.

15 [0049]           In this connection, although the above-mentioned example adopts the device configuration shown in Figure 4, control section 7 may be replaced by a microcomputer further including display control section 4, coordinate-detector section 5 and memory 6, that will guarantee like  
20 meritorious effects. Further, regarding the outline configuration of a touch panel entry device, entry/display section 3 may be formed in a separate tablet.

[0050]           Still further, although entry character key 10 is located  
25 separately apart from character-selection area 9 and fixed character display area 13 in the present example, entry character key 10 may be provided in fixed character display area 13. In this case, entry character key 10 may be displayed, not in an operation key fashion, in a specified display fashion, e.g., at a special location, in a large size, in a blinking fashion, in a different  
30 color, and so on, as far as it is distinguishable from fixed characters displayed in fixed character display area 13, that will guarantee like meritorious effects.

[0051] Still further, although entry character key 10 functions also as an operation key for fixing a selected character displayed thereon into a fixed character, it may be possible to replace this operation key function  
5 with another operation key separate from entry character key 10.

[0052] Still further, although character-selection area 9 defines a selected character in two dimensions of X- and Y- axes, it may be possible to define a selected character in three dimensions, for example, by the use  
10 of a pressure-sensible touch panel which is capable of instructing a kind of characters (*hiragana*, *katakana*, etc.) by pressing touch panel 2 down in Z-axis, and so on.

[0053] Still further, although an entry device is made of a touch  
15 panel in the present example, it may be possible to employ a pointing device such as an entry device for instructing coordinates corresponding to displaying content, e.g., a mouse, a trackball, a joystick, etc., that will guarantee like meritorious effects. In this case, the action of touching the display screen with a hand may be replaceable with the pressing of a button  
20 attached to the pointing device. Specifically, instructions to character-selection area 9 are given by moving a pointing cursor with keeping the attached button being pressed, that is equivalent to the skimming of the character-selection area by a finger. Instructions to keys 10, 11 and 12 may be also given by pressing the button.

25

[0054] Figure 7 is an explanatory diagram for character-selection areas in other examples of a touch panel entry device according to the present invention.

30 [0055] In Figure 7(a), sign 16 designates a ling-shaped character-selection area having an array of partitions 15 formed along the periphery direction, wherein an entry character is selected by skimming

character-selection area 15 [t: 16] in periphery direction. The control section for controlling this character-selection area 15 [t: 16] monitors coordinate data to find the direction of motion and reads a selected character from a selected character file stored in memory 6, wherein  
 5 corresponding characters are arranged in order, with reference to the selected character currently displayed on entry character key 10, and then make it be displayed on entry character key 10. Thus, it is possible to define a selected character by skimming character-selection area 16 with a finger in periphery direction. In this connection, a transparent  
 10 concaveconvex-shaped guide may be provided on the surface of touch panel 2 to be touched by a finger along character-selection area 16, whereby it will be possible to improve operability of the device.

[0056] Figure 7(b) is a diagram showing character-selection area 15 [t: 16] which is provided, at the center thereof, with operation keys for selecting kinds of characters comprising *hiragana* key 17 and alphabet key 18.

[0057] Figure 7(c) is a diagram showing character-selection area 20 in which partitions 19 are formed crosswise in X-axis and Y- axis directions. In the same way as in the example shown in Figure 7(a), by skimming character-selection area 20 with a finger in X-axis and Y- axis directions, a character corresponding to the direction of motion is read from a selected character file stored in memory 6, wherein the corresponding characters are  
 25 arranged in order, with reference to the selected character currently displayed on entry character key 10, and then displayed on entry character key 10.

[0058] Figure 7(d) is a diagram showing character-selection area 21 comprising operation keys for causing motion in four directions 21a to 21d. When pressing any of the said operation keys 21a to 21d as a cursor key, an amount of motion from a selected character currently displayed on entry  
 30

character key 10 is obtained in proportion to the touching interval to the key, whereby a target selected character is selectively read from a selected character file in which coordinate data and corresponding characters are arranged in a matrix fashion.

5

[0059] Next, referring to Figures 8 to 11 and further Figures 1 to 3, there is shown an automatic teller machine to which a touch panel entry device according to the present invention is applied so as to improve operability for aged persons and weak-eyed customers. Figure 8 is a diagram showing the system configuration of the machine, Figure 9 is an operational flow chart, Figure 10 is diagrams showing entry display screens, and Figure 11 is an external view of the automatic teller machine.

[0060] Firstly, referring to Figure 11, the outline configuration of an automatic teller machine (hereinafter referred to as "ATM") in the present example will be explained. In the figure, sign 22 designates an ATM as whole. Sign 112 designates the main body of ATM 22 with a side view wherein the upper front portion is cut away in an L-shape. Sign 113 designates the said L-shaped part, where the customer-operable devices are mounted. On the vertical front face of the L-shaped part 113, a handling display portion 114 for informing a customer the currently-operating state of ATM 22, a bank book slot 115 and a card slot 116 are arranged. A customer-handling portion 23, a bill deposition/payment port 118 and a coin deposition/payment port 119 are arranged on the level face of the L-shaped part 113. The customer-handling portion 23 comprises a display 32 having a 14 inch-screen of an A4 paper size (a CRT display in the present example) and a touch panel 33 arranged on the surface of the said CRT display 32. The portion 23 is so designed as to display various sorts of software keyboard and guidance on display 32, detect a position at which a customer presses the said keyboard with its finger, and thereby operate ATM 22. Note that, although it might be actually impossible to press down the surface of touch panel 33, the present specification uses the

expression of “pressing” for convenience sake in the track of button key’s operation. Display 32 is not limited to a CRT display, but it may be a liquid crystal display or other display devices.

5 [0061] Next, referring to Figure 8, the machine’s configuration will be explained. In the figure, ATM 22 comprises customer-handling portion 23, card information read/write mechanism 24, bill deposition/payment mechanism 25, coin deposition/payment mechanism 26, journal printing mechanism 27, bank book printing mechanism 28, power section 29,  
 10 control section 30 for controlling these sections, and interface section 31 for connecting with the host system through communication lines. Control section 30 for overall controlling ATM 22 internally includes a ROM storing a program for governing the operation of control section, a central processing unit (CPU) for executing this program, a RAM for  
 15 storing input/output data, and a memory for various sorts of image data, which are all not shown in the figure. Control section 30 makes various sorts of image data from the said memory be displayed on CRT display 32 and obtains coordinate data corresponding to the images displayed on the said CRT display 32 through touch panel 33 so as to execute entry task.

20

[0062] Next, referring to Figure 10 and Figures 1 to 3 in addition to Figure 9, the operation flow of ATM 22 will be explained. In the initiation of transaction, control section 30 reads image data of transaction selection screen shown in Figure 10 (a) from its internal memory and  
 25 makes the image be displayed on display screen 8 of CRT display 32 so as to establish a transaction-selectable state (Step 91). Transaction selection screen includes operation guidance displayed at the upper portion of display screen 8 and ATM-acceptable transaction items (401-406) in a view format displayed at the lower portion of display screen 8. Key regions  
 30 (411-416) used for selection of these transaction items are defined in touch panel 33. The touching of a customer to the key region of a desired item out of transaction items (401-406) with its finger gives an instruction for

the relevant task to ATM 22.

[0063] When a certain transaction item is selected, control section 30 reads the corresponding image data from its internal memory and makes  
5 the image be displayed on display screen 8 of CRT display 32. Here, assumed is the case wherein a customer selects "payment" 403. By the selection of "payment" 403, control section 30 makes an [entry] operation screen-selecting screen shown in Figure 10(b) be displayed on display screen 8 (Step 92). [Entry] operation screen-selecting screen includes  
10 operation guidance displayed at the upper portion of display screen 8 and "normal entry" key 501 and "enlarged entry" key 502 displayed at the lower portion of display screen 8. Key regions ("normal entry" key region 511 and "enlarged entry" key region 512) used for selecting types of [entry] operation screens are defined in touch panel 33. A customer can  
15 select any of these type-selecting keys for the purpose of using a desired [entry] operation screen. Once "enlarged entry" 502 is selected, control section 30 makes its internal memory tentatively register the selection of "enlarged entry" 502 until the "payment" procedure is completed. Note that the present example is designed such that entry [operation]  
20 screen-selecting screen is displayed only in "payment" and "transfer" procedures each of which requires the entry of characters.

[0064] After registering the selection of [entry] operation screen, control section 30 makes such a "payment" transaction screen as is shown  
25 in Figure 10(c) be displayed on display screen 8 (Step 93). "Payment" transaction screen includes "payment" transaction operation flow 601 for showing the whole of actions displayed on the left side of display screen 8 and operation guidance 602 for card insertion displayed on the right side of display screen 8. As a card is inserted in card information read/write  
30 mechanism 24, control section 30 confirms required information from the card.

[0065] Then, control section 30 ascertains, in its internal memory, the type of [entry] operation screen, i.e., whether or not “enlarged entry” 502 is selected (Step 94). When “enlarged entry” 502 is not selected, control section 30 makes a name display screen for a normal applicant shown in Figure 10(d) be displayed on display screen 8 (Step 95). On the other hand, when “enlarged entry” 502 is selected, control section 30 makes a name display screen for a weak-eyed applicant, which is such a character entry screen as is shown in Figures 1 to 3, be displayed on display screen 8 (Step 96). Name display screen for a normal applicant shown in Figure 10(d) is displayed in such a fashion that entry key board 701 is displayed in a window opened at the center of “payment” transaction screen. Key regions (not shown) corresponding to the respective character keys of keyboard 701 are defined in touch panel 33. The entry of applicant’s name is completed by pressing/entering the selected character keys and finally pressing the acknowledge key.

[0066] On the other hand, in name display screen for a weak-eyed applicant, a selected character defined in character-selection area 9 is displayed on entry character key 12 [t: 10], then fixed, and after that displayed in [fixed character] display area 13. In this manner, entry procedures are performed. The details thereof are omitted here because they are previously mentioned.

[0067] Next, control section 30 commands the display of a transferring address entry screen in the succeeding step (Step 97). Here, the procedures further succeeding to this transferring address entry screen are omitted. In any case, the present example is designed such that, as to an entry [operation] screen requiring a plurality of operation keys, control section 30 checks a type of [entry] operation screen and selects a desired [entry] operation screen according to the [checked] type so as to execute entry tasks.

[0068] In this connection, although the above-described example employs a name display screen for a weak-eyed applicant quite different from a name display screen for a normal applicant, a display screen shown in Figures 1 to 3 may be displayed in a window opened in the name display screen for a normal applicant.

[0069] As mentioned above, the present example can give, selectively as needed, the display of a sub-flow placing importance on higher accuracy for aged persons and weak-eyed persons in addition to a main flow preferring speed for normal users. Therefore, it is possible to provide an ATM capable of exhibiting good operability for the respective customers.

[0070]  
[Meritorious Effects of Invention] According to the present invention, a selected character freely selected in the character-selection area is tentatively displayed in the character display area until it is fixed as a fixed character. A user, who checks this tentative display, can return to the entry character selecting step again or carry on the entry operation. As the result of this, it is possible to reduce errors in entry.

[0071] Further, according to the present invention, a character-selection area, which requires no visual check, is condensed and the tentative display of a selected character, which requires visual check, is made easily viewable and large-sized. Thus, with [visually] checking the said selected character, it is possible to pick up a desired selected character and conclude the fixing of a selected character based on [checking] the said display of the selected character. Therefore, the accuracy of visual check on an entry character can be improved, whereby the operability [of a machine] can be also improved.

[Brief Description of Drawings]

[Figure 1] Figure 1 is an illustrative view of an entry display screen in an example of a touch panel entry device according to the present invention.

5 [Figure 2] Figure 2 is an illustrative view of an entry display screen in an example of a touch panel entry device according to the present invention.

[Figure 3] Figure 3 is an illustrative view of an entry display screen in an example of a touch panel entry device according to the present  
10 invention.

[Figure 4] Figure 4 is a diagram showing the device's configuration of an example of a touch panel entry device according to the present invention.

[Figure 5] Figure 5 is diagrams showing the contents of an entry  
15 character file in an example of a touch panel entry device according to the present invention.

[Figure 6] Figure 6 is a flow chart for explaining the device's operation of an example of a touch panel entry device according to the present invention.

20 [Figure 7] Figure 7 is an explanatory diagram for character-selection areas in other examples of a touch panel entry device according to the present invention.

[Figure 8] Figure 8 is a diagram showing the system configuration of another example of a touch panel entry device according to the present  
25 invention.

[Figure 9] Figure 9 is a flow chart for explaining the device's operation of another example of a touch panel entry device according to the present invention.

[Figure 10] Figure 10 is diagrams showing entry display screens in  
30 another example of a touch panel entry device according to the present invention.

[Figure 11] Figure 11 is an external view of another example of a touch

panel entry device according to the present invention.

[Explanation of Signs]

- |    |   |                    |                                  |
|----|---|--------------------|----------------------------------|
|    | 1: display  | 2: touch panel     | 3: entry/display section         |
| 5  | 4: display control section                                    |                    | 5: coordinate-detector section   |
|    | 6: memory   | 7: control section | 8: display screen                |
|    | 9: character [key]-selection area                             |                    |                                  |
|    | 10: selected character-designating area (entry character key) |                    |                                  |
|    | 11: execution key   | 12: clear key      | 13: fixed character display area |
| 10 | 14: partition   |                    |                                  |

(Figures 1 to 3)

ナ: *na*

マ: *ma*

エ: *e*

5

(Figure 5)

対応文字: corresponding character

(Figure 6)

10 スタート: START

選択文字選定: selected character picking-up (S61)

選択文字表示: selected character display (S62)

選択文字確定: selected character fixing (S63)

文字確定表示: fixed character display (S64)

15 再入力有無: re-entry or not (S65)

入力処理実行: entry execution (S66)

エンド: END

(Figure 7)

20 ひらがな: *hiragana*

アルファベット: alphabet

(Figure 8)

顧客操作部: customer-handling portion 23

25 カード情報読取／書込機構: card information read/write mechanism 24

紙幣入出金機構: bill deposition/payment mechanism 25

硬貨入出金機構: coin deposition/payment mechanism 26

ジャーナル印字機構: journal printing mechanism 27

通帳印字機構: bank book printing mechanism 28

30 電源部: power section 29

制御部: control section 30

インターフェース部: interface section 31

CRTディスプレイ: CRT display 32

タッチパネル: touch panel 33

(Figure 9)

5 スタート: START

取引選択画面表示: transaction selection screen (S91)

取扱画面選択表示: entry operation screen-selecting screen (92)

振込取引表示: "payment" transaction screen (S93)

取扱画面種別: type of entry operation screen (S94)

10 一般依頼人氏名表示: normal applicant's name display screen (S95)

弱視依頼人氏名表示: weak-eyed applicant's name display screen (S96)

振込先入力表示: transferring address entry screen (S97)

エンド: END

15 (Figure 10)

(a)

いらっしゃいませ: Hello!

ご希望のお取引を押してください:

Please press the type of transaction you want to make.

20 預け入れ: deposit

振り込み: payment

残高照会: balance inquiry

引き出し: withdrawal

振り替え: transfer

25 通帳記入: updating

(b)

いらっしゃいませ: Hello!

ご希望のコースを押してください:

Please press the course you want to make.

30 通常入力: Normal Entry

拡大入力: Enlarged Entry

(c)

カードを挿入してください: Please insert your card.

カード挿入口: card slot

(d)

ご依頼人名を押し: Please press your name and

- 5 最後に確認を押してください: finally press the confirmation button.

(Figure 11)

顧客操作部: customer-handling portion 23

タッチパネル: touch panel 33

- 10 本体: the main body 112

L字状部: L-shaped part 113

取扱表示部: handling display portion 114

通帳挿入口: bank book slot 115

カード挿入口: card slot 116

- 15 紙幣入出金口: bill deposition/payment port 118

硬貨入出金口: coin deposition/payment port 119